DOCUMENT RESUME

ED 435 838 CE 079 430

AUTHOR Dean, Brenda Pennington; West, Russell
TITLE Characteristics of Viable and Sustainable Workers for the Year 2015.
PUB DATE 1999-11-00
NOTE 26p.; Paper presented at the Annual Meeting of the Mid-South Educational Research Association (Point Clear, AL, November 1999).
PUB TYPE Opinion Papers (120) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Adult Education; Community Colleges; Delphi Technique; Educational Cooperation; *Educational Needs; Educational Practices; *Employer Attitudes; Employer Employee Relationship; *Employment Practices; Employment Projections; *Employment Qualifications; *Job Skills; Job Training; Labor Force Development; Labor Needs; Needs Assessment; Organizational Climate; Questionnaires; Regional Planning; School Business Relationship; Training Methods; Two Year Colleges; *Vocational Education; Work Environment
IDENTIFIERS *Tennessee (Northeast)

ABSTRACT

A two-round Delphi study was conducted to identify the characteristics of viable and sustainable employees in northeastern Tennessee in 2015. The Delphi panel selected for the study consisted of 25 experts who represented a cross-section of the businesses and communities in the 10-county area of northeastern Tennessee served by Walters State Community College. The five characteristics receiving the highest rankings were as follows: strong work ethic, positive attitude, willingness to learn, and dependable/adaptable work personality. The characteristics receiving the lowest rankings were the following: ability to use statistical process control, oral presentation skills, and math skills. Establishing cultures where workers are valued, establishing on-the-job and in-house training programs, and instituting participatory management strategies were deemed the important initiatives of successful companies in 2015. Initiatives considered less important to companies included replacing equipment, working with teachers to provide job shadowing experiences, and increasing the number of available internships. Initiatives increasing reading, math, and writing proficiency and initiatives facilitating collaborative curriculum development by industry and education were considered the most important initiatives required of public education. (The paper contains 25 references. Appended is the round 2 survey instrument, "Delphi Study of Desirable Characteristics of Viable and Sustainable Workers in 2015.) (MN)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 435 838

CHARACTERISTICS OF VIABLE AND SUSTAINABLE WORKERS FOR THE YEAR 2015

Brenda Pennington Dean
Hamblen County Schools
and
Russell West
East Tennessee State University

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
R West
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

A paper presented at the annual meeting of the Mid-South Educational Research Association, Point Clear, Alabama, November, 1999.

CE079430

BEST COPY AVAILABLE

INTRODUCTION

In order for the United States to compete in the global economy of the 21st century, the nation must successfully prepare workers and managers to meet the demands of the workplace. A Nation at Risk (National Council on Excellence in Education, 1983) gave scholarly and pragmatic attention to the relationship among a global economy, a quality education, and the welfare of the nation. The neo-classic study calls for a competitive work force that is diversified, competent in mathematics and science, and equipped with the skills to meet the technological demands of the 21st century. Conventional wisdom embraces the belief that to maintain its position of world leadership and prosperity the nation must produce a highly skilled worker who is adept as a problem solver. If this is true, the responsibility for producing employees capable of critical thinking is shared by the educational system as well as by business and industry.

D'Amico, Judy, and Gipel (1997) forecast that there will be an increasing need for workers who can adapt to the increasingly technological world and that the need for such workers will be exacerbated by the retirement of the baby boomers. Most valued will be the skilled employee who is able to work in more flexible settings and is the possessor of a good education. Are these the types of employees who will be required of all communities? If so, are schools preparing students to meet the forecast employment demands of business and industry?

Examination of the basic facts concerning the nation's educational status reveals that students in the U.S. are second only to students in the Netherlands in the number of hours spent in the classroom. Despite tremendous funding, however, the National Assessment of Educational Progress (NAEP) reveals virtually flat graphical results for student performance for the past twenty years (Walden, 1995). The results are frustrating to educators as well as to business and industry. Do these results indicate that current educational practices are inefficient and producing inferior workers incapable of meeting projected needs?

Purpose of the Study

For the nation and its constituent communities to succeed and enjoy economic prosperity in the 21st century, it must possess a ready supply of skilled workers. Identifying the characteristics of the viable and sustainable employee in the year 2015 would allow educational institutions and employers to

collaboratively develop programs to meet their mutual needs. Understanding the future job market in specific regions of this country is of critical importance to the economic welfare of these regions. Knowledge of the types of workers and their required skills will enable regional institutions and organizations to meet the employment requirements and ameliorate skill gaps. The purpose of this study was to forecast the characteristics of the viable and sustainable employee in the year 2015 in the ten county service area of Walters State Community College in Northeast Tennessee. The following areas were studied as they related to the forecast: 1) the projected employment skill demands of the businesses and industries in the ten county service area in the year 2015, 2) the initiatives (e.g., training) required and proposed by business and industry to meet their respective employment needs in the year 2015 and, 3) the external support by education required for industry and business within the ten county service area to meet their employment needs.

RESEARCH PROCEDURES

The Delphi Technique was used to forecast the characteristics of the viable and sustainable employee in the year 2015. The Rand Corporation developed the Delphi Method in the early 1950s. The method operates on the tenet that *n* heads are better than one. Collective wisdom is more likely to lead to the truth than is possible with a single decision-maker (Linstone & Turoff, 1975). Heath, Neimeyer and Pedersen (1988) described the Delphi Method as the best available forecasting tool, which gathers and combines the opinions of experts to obtain consensus about future development in a particular field Instead of physically bringing experts together, however, the Delphi Technique uses other means of communication channels for anonymous discussions. It is a method for achieving a structured interaction among a carefully selected panel through the avenues of questionnaires and controlled feedback. The structure of the process increases the likelihood that the results are accurate to guide good decision-making (Twiss, 1992).

The basis of the procedure is repeated administration of questionnaires to each member of an expert panel, without face-to-face contact. At the conclusion of each round of the questionnaire, some type of group feedback is provided to the expert panel. Panelists are provided the opportunity to reflect upon their responses in light of the feedback. This process continues for as many rounds as needed until

consensus is reached (Heath, Neimeyer, & Pedersen, 1988). Two rounds or iterations of the survey process were used in this study. The iterations were constructed in an objective manner to reach consensus on the research questions. Martino (1983) suggested that at least two rounds of polling are required for the Delphi group to reach a consensus and there is no advantage in going beyond two rounds.

Delphi Group Selection

Prudent selection of the Delphi Group is essential for conducting a Delphi study. Martino (1983) stated that the selection of the panel is the most important decision that the Delphi director will make and that solicitous care must be taken to appraise the degree of expertness. Although the selection of panelists is somewhat an arbitrary decision, insights into the future is more likely to come from individuals who are active scholars and practitioners.

In this study, the guidelines of Linstone and Turoff (1975) and Delbecq et al. (1975) were used in assembling the Delphi panel. A major criterion for selecting members for the Delphi group was the requirement that members be true experts. The researcher contacted by personal phone call the county executive of Claiborne, Cocke, Grainger, Greene, Hamblen, Hancock, Hawkins, Jefferson, Sevier, and Union counties to obtain the name of the chairperson of the county's industrial board or equivalent organization. The chairperson of each of the industrial boards, the chairman of the Private Industry Council, and the Dean of Industrial and Technical Education at Walters State Community College composed the nomination committee for the Delphi panel. The researcher contacted the nomination committee by personal phone calls and informed them about the purpose of the study and asked for their assistance in nominating experts within the ten county area to serve as potential panel members. Each of those contacted agreed to submit in writing nominations for the Delphi panel. A cover letter, a nomination form, and a self-addressed envelope was sent to the industrial board chairpersons, the Private Industry Council chairperson, and to the Dean of Industrial and Technical Education at Walters State Community College. The cover letter requested nominees in the areas of general manufacturing, metalworking, furniture production, health care, printing industry, automotive manufacturing, textile production, chemical industry, and a category described as other. Further, the letter reiterated the qualities sought in panel member and described such members as knowledgeable about their respective

industry and its future, and the particular qualities and skills that will be needed by viable and sustainable workers in that industry in the year 2015.

The individuals receiving multiple nominations formed the core of the panel. The researcher initially contacted these individuals by phone, explaining the study and asking them to participate and to nominate others who were similarly knowledgeable concerning industry and the workforce. Through this daisy chaining or snowball sampling process, the process of one nomination leading to another nomination, other nominees became evident. From the initial nominees by the nominating committee and by the nominations of panel members the researcher chose the Delphi panel. The panel included representatives of all the categories of industry selected for study and all individuals receiving multiple nominations. Although no attempt was made to recruit panel members to increase the demographic diversity of the panel, nominations included males and females and Caucasian and Afro-American nominations.

Panel Size

The size of a Delphi panel may vary depending on the problem and the complexity of the issue being explored. It is most germane that the panel of experts represents a true cross-section of experts. Martino (1983) established that a panel of 15 panelists from a cross-section of experts in a given field is sufficient to provide reliable results. In this study, a panel of 25 experts was utilized to conduct the first iteration. This number met the criteria established by Linstone and Turoff (1975), Clayton (1997), Martino (1983), and Delbecq, et al. (1975). The members of the Delphi panel represented a cross-section of the businesses and industries in the ten county service area of Walters State Community College and possessed the level of expertise needed to make forecasts and predictions concerning the characteristics of the viable and sustainable employee of the future.

Instrumentation

Round One Survey. The initial iteration allowed panel participants the opportunity to respond to broad issues in narrative form. The panelists were apprised of the length of time required to answer this iteration at the time of initial contact and before they formally agreed to engage in the study. Responses to the first iteration were the basis of the second iteration. The researcher analyzed the answers to ascertain where the group had produced similar ideas, visions, and views of the future.

The major areas from which the general questions for the first iteration was drawn are listed below along with their supporting references: 1) employer satisfaction with job applicants: basic skills, thinking skills, personal qualities, use of resources, interpersonal skills, information usage, systems understanding, and technological skills (Brosnan, 1998), 2) worker characteristics (Carson, 1992; National Alliance of Business, 1991), 3) impact of demographic changes on the workforce and its impact on manufacturing: aging baby boomers, diversity, and women (D'Amico, Judy, & Gipel, 1997), 4) K-12 education program: career education, vocational training, hands-on learning, application based instruction, contextual learning, and academics (McNelly, 1995) 5) private sector training (Eisen, 1993; Lau, 1993) 6) technology skills: technology selection, application to task, and maintenance and troubleshooting equipment (The Secretary's Commission on Achieving Necessary Skills [SCANS], 1992. 7) employee recruitment and retention (Coates, Jarrat, & Mahaffie, 1991) 8) critical skill shortages (Khojasteh, 1994) 9) basic skills in the workplace (Khojasteh, 1994), 10) experience and training (Lau, 1993), 11) interpersonal skills: team membership, teaching, serves clients, leadership, negotiation, and working with diversity (SCANS, 1992), 12) information: acquisition, evaluation, organization, maintenance, interpretation, communication, and computer use (SCANS, 1992), 13) resource management: time, money, materials, facilities, and human resources (SCANS, 1992), 14) idealized employee (New Hampshire School to Work, 1998), 15) Support from government agencies (Dentzer, 1992), 16) physical abilities and sensory perceptions (Schriner, 1998), 17) systems: social, organizational, and technological systems; monitoring and self-correction, and system design and improvement (SCANS, 1992), 18) cross-functional skills (Waddell, 1998), 19) educational profile (SCANS, 1992), 20) personal qualities (Waddell, 1998), 21) lifelong learning (Drucker, 1994), 22) thinking skills: creativity, decision-making, problem solving, conceptualizing, knowing how to learn, and reasoning (SCANS, 1992), and 23) educational support of industry (Hamilton & Hamilton, 1997).

Pilot Study. A pilot study was conducted to field test the initial Round One Questionnaire. Six middle and upper level management people from Hamblen County completed the survey instrument. These six individuals were representative of the same organizational mix that was utilized to conduct the main portion of the study. The members of the pilot study were precluded from participation in the Delphi panel. The purpose of the pilot study was to test the structure, format, content, scope, and interpretation

of questions to eliminate ambiguity or vagueness that might have impacted the quality of response by the Delphi panel during the first iteration.

Round Two Survey. The purpose of the second iteration was to establish a stronger consensus on the concepts that emerged most frequently from the first iteration. The instrument for the second round asked participants to acknowledge and accept, to whatever extent each was agreeable, the most commonly held views from the first questionnaire. Respondents recorded the extent of their agreement with each of the items, which were placed into a Likert-type scaling format. The Likert scale was used to measure the level of agreement among the panelists concerning the qualities desired in the workers of 2015 and the initiatives required by industry and public education to ensure the availability of the needed workers. The respondents were asked to choose a number along continuum from 1 to 5. A response of "1" indicated that the participant strongly agreed with the statement and believed it to be critical or urgent in nature. A response of "5" indicated strong disagreement with the statement. The content analysis of the narrative responses generated by the seventeen open-ended questions from the Round 1 iteration formed the basis of the construction for the 55 item Round Two Questionnaire. The answers to the first round instrument were analyzed to determine the emerging areas of agreement among the committee. The analytical examination of the data included taking the exact statement of the respondents and placing the statement into a topical category. Tallies were made of the number of times that a member of the Delphi expressed a particular idea. From these tallies, the researcher determined what items should be included in the second round iteration. In the majority of cases, inclusion of an item in the second round was very obvious due to the large degree of support among the panelists. However, an arbitrary cut-off was necessary to determine if a belief expressed by a panel member warranted further consideration in the Delphi process. The point of demarcation was established at a count of four. Any opinion or perception that received four or more concurring statements was included in the Round 2 questionnaire. The actual instrument used in Round Two is provided in Appendix A.

Data Analysis

The analysis of the results from the second iteration survey was descriptive in nature. For each of the items on the instrument a mean and standard deviation was calculated, along with a modal response. Further, panelists were asked to identify the ten most important characteristics or initiatives in each of the

three sections of the second iteration. The important items were given a value of 1, the next most important a value of 2, etc. The scores of 1 were then multiplied by 10, the scores of 2 were multiplied by 9, the scores of 3 were multiplied by 8, etc. These values were then summed to create an "importance points" score. These total point scores were then rank ordered to give an indication of which items were forecast as being the most important, with a rank of "1" representing to most important, a "2" representing the most important, etc.

FINDINGS

In Table 1, the important desired worker characteristics for the year 2015 are identified. As shown in the table, there were five characteristics that were ranked ahead of the others. The characteristics were a strong work ethic, positive attitude, willingness to learn, and dependable/adaptable work personality. Those characteristics receiving the lowest rankings were ability to use statistical process control, oral presentation skills, and math skills.

In Table 2, the important initiatives of successful companies for the year 2015 are displayed. The most important initiatives included such things as establishing cultures in which workers were valued, establishing on-the-job and in-house training programs, and instituting participatory management strategies. Those initiatives that were considered less important included replacing equipment, working with school teachers to provide job shadowing experiences, and increasing the number of available internships.

The important initiatives identified for education are shown in Table 3. The most important initiatives included increasing reading, math and writing proficiency, along with initiatives that bring industry and education together to collaboratively develop curriculum. Less desirable initiative included developing public speaking skills, developing new apprenticeship programs, and technical classes like electronics and maintenance.

Table 1.

Forecasted Desired Worker Characteristics in Rank Order with Associated Importance Points, Means, Standard Deviations, Modal Response Category and Choice Frequencies

Characteristics	Rank	Points	M	Mode	SD	N	1	2	3	4	5
A strong work ethic	1	124	1.5	1	0.7	22	13	7	2	0	0
A positive attitude	2	123	1.4	1	0.6	22	14	7	1	0	0
The ability and willingness to learn	3	106	1.5	1	0.5	22	12	10	0	0	0
Dependable as indicated by low absenteeism	4	99	1.5	1	0.6	22	12	9	1	0	0
Adaptability to the workplace	5	98	1.4	1	0.5	22	13	9	0	0	0
Personal integrity	6	85	1.5	1	0.8	22	13	7	1	1	0
Drug and alcohol free	7	67	1.3	1	0.5	22	17	4	1	0	0
The ability to effectively participate in a work team	8	66	1.6	2	0.6	22	10	11	1	0	0
A high school graduate	9	65	1.5	1	0.6	22	13	8	1	0	0
Computer literacy, including the usage of software	10	61	1.6	1	0.7	22	11	9	2	0	0
Critical thinking skills	11	52	1.9	2	0.5	22	5	15	2	0	0
The ability to understand written communication	12	42	1.8	2	0.6	22	7	12	3	0	0
Creativity(Thinks outside the box)	13	41	2.1	2	0.8	22	6	9	6	1	0
Listening skills	14	33	1.8	2	0.6	22	7	12	3	0	0
Advanced vocational-technical skills	15	33	1.8	2	0.6	22	7	12	3	0	0
Ability to handle multiple tasks simultaneously	16	30	2.1	2	0.8	22	5	11	5	1	0
Logical method of solving problems	17	29	2.1	2	0.7	22	3	15	3	1	0
The ability to interpret data, including graphs and charts	18	16	2.2	2	0.7	22	2	14	5	1	0
Decision-making skills	19	15	2.0	2	0.8	22	5	12	4	1	0
Mathematical computation skills	20	13	2.2	2	0.6	22	2	15	4	1	0
Time management skills	21	3	2.3	3	0.7	22	2	7	12	1	0
Ability to make oral presentations to a work group	22	1	2.4	2	0.1	22	2	10	9	1	0
Capable of learning Statistical Process Control	23	0	2.6	2	1.1	22	3	8	6	4	1

Table 2.
Forecasted Initiatives of Successful Companies in Rank Order with Associated Importance Points, Means, Standard Deviations, Modal Response Category and Choice Frequencies

Initiative	Rank	Points	M	Mode	SD	N	1	2	3	4	5
Establish a culture that values and respects the worker	1	154	1.3	1	1.3	22	17	4	1	0	0
Increase on-the-job training for employees	2	139	1.5	1	0.6	22	12	9	1	0	0
Expand in-house training programs	3	118	1.6	1	0.7	22	12	7	3	0	0
Institute a participatory management style	4	114	1.8	2	0.8	22	8	13	0	0	1
Develop pay scales linked to performance or results	5	93	1.9	2	0.8	22	8	9	5	0	0
Provide tuition reimbursement for job related training	6	89	1.5	1	0.7	22	12	8	2	0	0
Assist in development of K-12 curriculum	7	85	2.3	3	0.8	22	4	8	9	1	0
Participate in local school-oriented organizations	8	65	2.2	2	0.7	22	2	14	5	1	0
Participate in an apprenticeship program	9	54	2.5	2	1.0	22	3	9	6	3	1
Provide all employees opportunities for upward mobility	10	54	2.2	1,3	1.1	22	7	6	7	1	1
Offer flexible work schedules	11	50	2.4	3	1.2	22	6	6	7	1	2
Provide in-house training for industry-wide certification	12	38	2.4	3	0.9	22	4	7	9	2	0
Provide extensive benefit package	13	31	2.4	3	1.0	22	6	5	8	3	0
Increase the number of internships	14	27	2.5	2	0.7	22	0	14	5	3	0
Offer on-site job - shadowing to teachers	15	25	2.2	2	0.9	22	5	11	3	3	0
Replace outmoded equipment used in k-12 education	16	23	2.7	3	0.9	22	2	6	10	4	0

Table 3.
Forecasted Initiatives of Public Education in Rank Order with Associated Importance Points, Means, Standard Deviations, Modal Response Category and Choice Frequencies

Initiatives	Rank	Points	M	Mode	SD	N	1	2	3	4	5
Increase student reading proficiency	1	137	1.5	1	0.7	22	13	6	3	0	0
Cooperatively develop curriculum/materials with industry	2	132	1.9	1	0.9	22	9	8	4	1	0
Increase student mathematical proficiency	3	131	1.5	1	0.7	22	13	7	2	0	0
Increase student writing proficiency	4	116	1.8	2	0.8	22	8	11	2	1	0
Expand vocational-technical education	5	111	1.8	1	0.8	22	10	8	3	1	0
Emphasize technology at all levels	6	86	1.9	1	0.9	22	9	7	5	1	0
Employ teachers with practical industrial experience	7	84	2.2	3	1.0	22	8	3	9	2	0
Integrate theoretical teaching and practical application	8	79	2.0	1	0.7	22	13	6	3	0	0
Develop student attitudes of tolerance for diversity	9	70	2.3	2	0.9	22	4	10	5	3	0
Realize that not all students will go to college	10	70	1.9	1	1.0	22	12	6	3	1	0
Provide appropriate career guidance for all students	11	67	2.0	1	0.7	22	10	7	3	2	0
Incorporate conflict resolution in K-12 curriculum	12	47	2.3	2	0.8	22	2	14	3	3	0
Expand apprenticeship programs	13	35	2.4	2	0.8	22	3	10	7	2	0
Offer specialized classes in electronics	14	20	2.6	3	0.9	22	3	6	10	3	0
Offer specialized classes in maintenance	15	19	2.8	3	0.8	22	2	5	11	4	0
Provide more opportunities to develop public speaking ability	16	9	2.8	3	0.9	22	2	6	9	5	0

CONCLUSIONS AND RECOMMENDATIONS

Research Question # 1: What will be the competitive characteristics of a viable and sustainable worker in the year 2015?

The Delphi committee expressed the belief that personal qualities rather than highly developed technical skills will be the most important characteristics of the desirable worker of 2015. The panelists posited that imperative to successful employment will be a strong work ethic. Supporting this tenet, the panel forecasted that the successful worker will have a positive attitude and demonstrate dependability as indicated by low absenteeism. Several panelists in the narrative of the first iteration described a future workplace that will have a lean workforce due to the impact of globalism. Such an environment will require workers upon whom the organization may rely for daily, concerted efforts to meet the organizational goals.

The expert panel averred that the preferred employee will bring to the work place an ability and willingness to learn. Further, this individual will possess the capacity of adaptability. The opinion of the committee was not that the worker must come to the work place with all skills in tact, but rather know how to learn and be willing to learn.

A man or woman of high personal integrity will be valued by organizations. The Delphi group valued this trait higher than any basic skill. Again, the committee expressed the idea of the value of personal character. Further, the desired employee will be drug and alcohol free. No other belief or opinion received stronger agreement.

In regard to education, the Delphi panel felt that an individual with a formal high school education is more important for viability in the workplace than advanced technical skills. The workplace will demand computer literacy, including the usage of appropriate software or the equivalent of computer literacy in 2015. Although the Round 1 iteration was replete with statements of the importance of basic educational skills, in the Round 2 iteration basic educational skills fell to the second tier of employee attributes. In order of importance as determined by the committee were computer literacy, written communication, listening, advanced vocational-technical, mathematical computation, and oral communication skills. However, it is noted that the committee was forecasting the idealized worker in the factory who serves as an operator or the worker delivering direct services and not the supervisor or the professional employee.

The ability to effectively participate in a work team will be a valued asset of desired future workers. Many narrative comments stressed the importance of workers being able to move from an attitude of "individual good" to an attitude of "team good". The panelists emphasized the importance of the ability to fostering positive relations with other team members and being able to solve problems collectively by attacking the problem rather than the personalities involved.

Although vital to successful workers, the traits that may be clustered as thinking skills were valued as second tiered in importance. These qualities include critical thinking skills or thinking outside the box, the level of organizational thought that allows one to handle multiple tasks simultaneously, logical methods of solving problems, data interpretation, and decision-making skills.

The placement of these skills in the second tier does not indicate that the panelists do not believe these skills as critical to successful employees based on the volume of comments in the Round 1 iteration. Rather, these attributes are considered less critical than individual character and work ethos.

The purpose of the study was to forecast desired worker characteristics. Throughout the study the Delphi panel expressed that the market will demand that workers come to the work place as men and women of high moral character who are willing to work and dedicated to the organization. Such workers will bring with them a basic level of knowledge that will empower them to learn the specifics that the ever-changing work place will demand, requiring sustainable employees to be lifelong learners.

Research Question # 2: What will successful companies do to ensure the availability of competent workers in the year 2015?

The strong and clear consensus of the Delphi panel was that establishing a culture that values and respects the worker is the most salient initiative to ensure the availability of workers in 2015. Similarly, there was strong consensus among the panelists regarding participatory management as an avenue to guarantee quality workers are available. Culture is perhaps the most powerful tool available to business and industrial leaders who are forward looking. There are many implications from the fostering of such a work culture. The benefits extend to the organization and equally to the members of the organization. Empowering organizational cultures are marked by vertical and horizontal communication that leads to equal access to information to foster innovation. Effective team membership is a by-product

of the climate, as indicated by the relationships among associates and a motivation directed by values and interest rather than strict supervision and criticism. Additionally, the effective culture nurtures lifelong learning at all organizational levels. The adage that a happy worker is a good worker is fulfilled in this culture.

The Delphi panel affirmed strong conviction that expanded on-the-job-training, additional in-house training programs, and providing a program of tuition reimbursement for job related training are important methods for employee development. However, the committee expressed that specific training was more important than general training to meet the criteria of industry-wide standards.

The committee had stronger confidence in-house training activities that industry and business offer are more valuable than interaction with public schools. Only the cooperative development of K-12 curriculum and associated materials was considered in the first tier of initiatives. Apprenticeships, participation in local school-oriented organizations, internships, job-shadowing for teachers, and replacing outmoded equipment used in K-12 education were rated as less important than the training designed and delivered by industry to meet specific needs. In the narrative of the Round 1 iteration, the issue of liability was mentioned by panelists. Although not specifically mentioned, one is left to wonder if there is an issue of lack of confidence in the public school to provide the needed training or if the specificity of the training is the issue.

Ardent support was affirmed for developing pay scales that are directly linked to performance or results. However, the panelist did not express the same level of commitment to the opinion that offering flexible work schedules and providing extensive benefit packages will be instrumental in securing quality workers. Although a decent wage is helpful in retaining quality employees, the panelist returned to the belief that the desired associate of 2015 will be more intrinsically motivated and derive satisfaction from the work itself.

Research Question # 3: What changes in public education will be required to meet industry's needs in the year 2015?

The panel's message to public education is very clear. If it is the intent of public education to develop a generation of learners ready to enter the world of work, then hone the basic skills and be open to industry's needs. The panelist identified increasing student reading proficiency, mathematical

proficiency, writing proficiency, technical literacy, and expanding vocational-technical education at all levels as imperative. However, these items were not among the top tier of characteristics desired in the worker, but they do enable the worker to be able to learn and adapt to changes in the work place.

Furthermore, the panelist stated the importance of public education being open to the needs of business and industry. The second ranked item was to cooperatively develop curriculum and associated materials with industry. The committee believed that the current curriculum is too abstract and theoretical for the learner to easily translate the learning to its practical application on the job. Additionally, the Delphi group averred that hiring teachers with practical industrial experience would be helpful in securing valued employees of 2015. However, it is noteworthy that in regard to Research Question #2, the panelist ranked job-shadowing by teachers as next to last among the field of initiatives available to business and industry. Job-shadowing is the only avenue of practical industrial experience available to many teachers, particularly those in the academic realm.

The experts expressed strong support for changes in guidance services within public school to provide all learners with appropriate career guidance and at an earlier age. That level of career guidance would include the career possibilities and benefits one may obtain in the work place. Further, the panelists communicated that all educators must realize that not all children will leave high school for college. A large portion will shortly come to the work place. Acting on this paradigm change will result in significant change in the curriculum and result in more practical application across the curriculum to develop marketable job skills.

The panelists expressed the opinion that expanding vocational-technical education at all levels was of paramount importance. However, the panel communicated only mild support for the expansion of apprenticeship programs or specialized vocational-technical classes as electronics or general maintenance.

Recommendations For Further Research

The broad study examined many major areas concerning forecasted desirable workers and the initiatives that will be required of business and industry and public school to develop this cadre of high caliber workers. The recurrent themes that emerged in the study are worthy of additional study. These themes include interpersonal skills of the successful worker, basic skills required for workplace success,

effective industry directed training programs, and initiatives by business and industry to build positive work cultures. The study needs to be expanded to other regions of the country and to other business and industrial sectors to ascertain if the findings of this study vary widely from the perceptions and opinions of broader selection of business and industry leaders.

Summary

The value of this study is its general forecast of the qualities that will enable workers to successfully enter the work force and continue viable employment. Additionally, the study forecasts the initiatives that industry and public education must pursue to have skilled employees available to industry to allow the nation and its constituent communities to compete in the global economy. Organizations that are interested in developing high caliber workers will begin to implement strategies based on the findings, conclusions, and recommendations of this study.

On the dawn of the 21st century, the economic welfare of all communities and the nation are intrinsically linked to the availability of a competent work force to compete in the global market. Investments by industry and public schools in the development of quality workers are not an optional activity, but rather an imperative. A caveat for all organizations is to look beyond shortsighted goals and to be proactive in the solution of this problem. The mutual conclusions of this study and similar forecasted studies will provide impetus to direct changes required to meet future employment needs.

REFERENCES

Brosnan, J.W. (1998, January 9). Focus on education workforce, manufacturers urge. The Commercial Appeal, p. B8.

Carson. D. L. (1992). The quality of entry level workers in the printing industry as perceived by educators and employers in Illinois (job skills training). Urbana-Champaign, IL: University of Illinois.

Clayton, M. (1997). Delphi: A technique to harness expert opinion for critical decision-making tasks in education. Educational Psychology, 17(4), 373-386.

Coates, J. F., Jarratt, J., Mahaffie, J. B. (1991). Future work. The Futurist, 25(3), 9-19.

D'Amico, C., Judy, R., & Gipel, G. (1997). Workforce 2020: Work and workers in the 21st century. Indianapolis, IN: Hudson Institute.

Delbecq, A., Van de Ven, A., & Gustafson, D. (1975). Group techniques for program planning. Glenview, IL: Scott, Foresman.

Dentzer, S. (1992, September 21). How to train workers for the 21st century. U.S. News and World Report, 113(11), 72-78.

Drucker, P. F. (1994). Trade lessons from the world economy. Foreign Affairs, 73(1), 99, 108.

Eisen, P. (1993). A new game plan for American workers. Vocational Educational Journal, 68(7), 18-19, 57.

Gordon, T. (1992, July). The methods of futures research. The Annals of the American Academy of Political and Social Science, 552, 25-35.

Hamilton, M. A., Hamilton S. F. (1997). Learning well at work: Choices for quality. Washington, DC: U.S. Department of Education, U.S. Department of Labor, U.S. Government Printing Office.

Heath, A., Neimeyer, G., & Pedersen, P. (1988). The future of cross-cultural counseling: A Delphi poll. Journal of Counseling and Development,67, 27-30.

Khojasteh, M. (1994). Workforce 2000: Demographic changes and their impacts. International Journal of Public Administration, 17(3-4), 465-505.

Lau, R. S. M. (1993). Competitive manufacturing: Getting back to the basics. SAM Advanced Management Journal, 58(4), 26-31.

Linstone, H., & Turoff, M. (1975). The Delphi method: Techniques and applications. Reading, MA: Addison Wesley.

Martino, J. (1983). Technological forecasting for decision making. Amsterdam, The Netherlands: Elsevier Science Publishing Co., Inc.

McNelly, D. E. (1995). Tennessee secondary vocational-technical education standards and measures employers satisfaction 1994-1995. Knoxville, TN: University of Tennessee, College of Education.

National Alliance of Business. (1991). The business roundtable participation guide: A primer for business and education. New York, NY.

National Council on Excellence in Education. (1983). A nation at risk: The imperative for educational reform. Washington, D.C.: National Commission on Excellence in Education.

New Hampshire School To Work. (1998) Connecting classroom and community. [Online]. Available: http://www.lr.net/stw/home.html.

Secretaries Commission on Achieving Necessary Skills (SCANS). (1991). What work requires of schools: A SCANS report for American 2000. Washington, DC: U.S. Government Publishing Office.

Schriner, J. (1998, May 4). Coping with the labor shortage. Industry Week, 247(9),18.

Twiss, B. (1992). Forecasting for technologists and engineers. London: Peter Peregrinus.

Waddell, J. R. (1998, February) Looking for mr./ms. right. Supervision, 59(2), 16-18.

Walden, M. (1995, November 22). Education must be reexamined to get better. Greensboro News Record, p.2.

A Delphi Study of Desirable Characteristics of Viable and Sustainable Workers in 2015

Brenda Pennington Dean
615 Shockley Avenue
Morristown, Tennessee 37814

Name _____

Directions:

A. Please ***circle the number*** on the scale below each statement that best reflects the extent to which you agree or disagree with the statement.

1 = Strongly agree, critical or urgent

2 = Relevant or of considerable significance, a second order priority

3 = Agree, the item has some importance

4 = Insignificantly relevant, has little importance

5 = Strongly disagree, no relevance, no priority, no measurable effect

B. For each of the three statements below, ***in the blanks provided, indicate the ten most important*** characteristics or actions in each category. ***Place a #1 in the blank of the most important,*** a #2 in the blank of the second most important, and likewise continue until you identify the top ten characteristics or actions.

1. In 2015, the viable and sustainable worker will possess the following characteristics:

_____**Ability to make oral presentations to a work group**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Advanced vocational-technical skills**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Computer literacy, including the usage of software**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Critical thinking skills**

1 Strongly Agree 2 3 Agree 4 5 Strongly Disagree

_____ **A positive attitude**

1 Strongly Agree 2 3 Agree 4 5 Strongly Disagree

_____ **A strong work ethic**

1 Strongly Agree 2 3 Agree 4 5 Strongly Disagree

_____**The ability and willingness to learn**

1 Strongly Agree 2 3 Agree 4 5 Strongly Disagree

_____**Adaptability to the changing workplace**

1 Strongly Agree 2 3 Agree 4 5 Strongly Disagree

_____**Mathematical computation skills**

1 Strongly Agree 2 3 Agree 4 5 Strongly Disagree

_____**The ability to effectively participate in a work team**

1 Strongly Agree 2 3 Agree 4 5 Strongly Disagree

_____**The ability to interpret data, including graphs & charts**

1 Strongly Agree 2 3 Agree 4 5 Strongly Disagree

_____**Decision-making skills**

1 2 3 4 5

Strongly Agree Agree Strongly Disagree

_____The ability to understand written communication

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____Listening skills

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____Time management skills

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____Ability to handle multiple task simultaneously

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____Drug and alcohol free

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____A high school graduate

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____Personal integrity

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ Creativity (Thinks outside the box)

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ Logical method of solving problems

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ Dependable as indicated by low absenteeism

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ Capable of learning Statistical Process Control

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

2. In order to ensure the availability of competent workers in 2015, successful companies will pursue the following initiatives:

_____ Participate in an apprenticeship program

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____Expand in-house training programs

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____Increase on-the-job-training for employees

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____Participate in local school-oriented organizations

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____Assist in the development of K-12 curriculum

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Provide tuition reimbursement for job related training**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Increase the number of internships**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Institute a participatory management style**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Offer flexible work schedules**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Establish a culture that values and respects the worker**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Provide extensive benefit packages**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Develop pay scales linked to performance or results**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Provide all employees opportunities for upward mobility**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Provide in-house training for industry-wide certification**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Replace outmoded equipment used in K-12 education**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Offer on-site job-shadowing to teachers**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

3. In order to meet industry's needs for a competent workforce in 2015, public education will undertake the following actions:

_____ **Expand vocational-technical education**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Employ teachers with practical industrial experience**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Expand apprenticeship programs**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Cooperatively develop curriculum and associated materials with industry**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Emphasize technology at all levels**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Offer specialized classes to teach general maintenance**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Offer specialized classes in electronics**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Provide more opportunities in the school curriculum for students to develop public speaking ability**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Develop student attitudes of tolerance for diversity**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Increase student writing proficiency**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Incorporate conflict resolution in K-12 curriculum**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Increase student mathematical proficiency**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Increase student reading proficiency**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Integrate theoretical teaching and practical application to support the workplace**

1 2 3 4 5
Strongly Agree Agree Strongly Disagree

_____ **Provide appropriate career guidance for all students**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree

_____ **Realize that not all students will go to college**

1	2	3	4	5
Strongly Agree		Agree		Strongly Disagree